Claims

1. A fabricating method of an optical fiber comprising the steps of:

a drawing step wherein an optical fiber preform having a core region and a cladding region formed on the periphery of said core region is heated and drawn with a drawing furnace into an optical fiber;

a heat treatment step wherein said optical fiber drawn with said drawing furnace is annealed by a heating furnace disposed downstream of said drawing furnace; and

a cooling step wherein said optical fiber annealed with said heating furnace is introduced with a temperature of fiber at 700°C or more into a cooling means disposed downstream of said heating furnace, and is cooled forcibly by said cooling means,

wherein in the course of said heat treatment step, said optical fiber is annealed on such annealing conditions that meet the requirements that the cooling speed of said optical fiber is to be 2000°C/second or less, and that the period of annealing time L/Vf is equal to or longer than the relaxation time τ, the length of said heating furnace being designated as L (m), the line speed of said optical fiber being designated as Vf (m/second), the viscosity of said optical fiber at the entrance of said heating furnace

being designated as ηS (Pa·second), the tension of said optical fiber per a unit cross sectional area being designated as K (Pa), and the relaxation time thereof being defined as $\tau=\eta S/K$.

2. The fabricating method of the optical fiber according to claim 1, wherein, in said heat treatment step, said optical fiber is annealed by said heating furnace at a temperature of 800-1600°C.

3. The fabricating method of the optical fiber according to claim 1, wherein, in said heat treatment step, said optical fiber is annealed by said heating furnace at a temperature of 1100-1600°C.

4. The fabricating method of the optical fiber according to claim 1, wherein, in said cooling step, said optical fiber is introduced into said cooling means at a temperature of 700-1300°C.

5. The fabricating method of the optical fiber according to claim 1, wherein, in said drawing step, said heat treatment step and said cooling step, the line speed of said optical fiber is 300m/minute or more.

6. The fabricating method of the optical fiber according to claim 1, wherein, in said heat treatment step, said optical fiber is annealed by said heating furnace for 0.03-0.8 seconds.

7. The fabricating method of the optical fiber according to claim 1, wherein said core region is doped

with Ge in such a quantity of dopant that the relative refractive-index difference [Ge] expressed by % with respect to pure SiO_2 satisfies a condition [Ge]≥0.3%.

8. The fabricating method of the optical fiber according to claim 1, wherein said cladding region has one or more cladding layers comprised of either of pure SiO_2, SiO_2 doped with Ge or SiO_2 doped with F respectively.

9. An optical fiber comprising a core region and a cladding region formed on the periphery of said core region, wherein said core region is doped with Ge in such a quantity of dopant that relative refractive-index difference [Ge] expressed by % with respect to pure SiO_2 satisfies a condition [Ge]≥0.3%,

the Rayleigh scattering coefficient A (dB/km·μm^4) and the transmission loss $\alpha_{1.00}$ (dB/km) at a wavelength of 1.00μm are 97% or less of the reference value A_0 and α_0 respectively expressed by the following formulas:

A_0=0.85+0.29 [Ge]

α_0=0.86+0.29 [Ge], and

the difference in transmission loss $\Delta\alpha_{1.38}$ at a wavelength of 1.38μm between before and after hydrogen treatment is 0.15dB/km or less.

10. The optical fiber according to claim 9, wherein said cladding region has one or more cladding layers comprised of either of pure SiO_2, SiO_2 doped

with Ge or SiO_2 doped with F respectively.